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ABSTRACT

Four areas of college and university characteristics relevant to the broad policy concerns of the Title III "Developing Institutions" program are identified in this research study. They are: (1) the structural development of colleges and universities; (2) the levels of various collegiate activities, such as the number of students, faculty, library volumes, or terminal degree recipients on the faculty; (3) the relative efficiency with which colleges and universities provide instruction and, where appropriate, public service and research; and (4) the determinants of student demand with a special focus on those institutional actions affecting individuals' college-going choices. This study grew out of two general concerns: how to conceptualize developmental sequences for higher education institutions and how effective is federal aid in accomplishing national objectives, such as student access and choice, program and institutional diversity, and institutional growth and survival. Focus is on the effects of Title III funds on colleges and universities. Only existing data bases, historical documents about Title III, and literature on institutional development and institutional resources use are considered in the study. Related topics are treated in separate appendices. (LBH)

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THE DEVELOPMENT OF INSTITUTIONS OF HIGHER EDUCATION: THEORY AND ASSESSMENT OF IMPACT OF FOUR POSSIBLE AREAS OF FEDERAL INTERVENTION

Final Report

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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This study of the development of colleges and universities was undertaken for the United States Office of Education, Office of Planning, Budgeting and Evaluation under contract number 300-75-0221. The project was conducted by a research team from the Harvard Graduate School of Education under the direction of George B. Weathersby. The purposes of the study were to use a merged machine-readable data base and relevant historical documents, to identify the institutional effects of funds from Title III of the Higher Education Act of 1965. Reports prepared under this contract are listed below and copies may be obtained from the USOE-OPBE (Room 4087, 400 Maryland Avenue, S.W., Washington, D.C. 20202) or the Harvard Graduate School of Education (c/o George B. Weathersby, #450 Gutman Library, Harvard University, Cambridge, Massachusetts 02138). Please include a check for the indicated amounts for orders from Harvard.

The research team consisted of Frederic Jacobs, Gregory A. Jackson, Edward P. St. John, Tyler Tingley, and George B. Weathersby. Research assistance was provided by Joan Gallos and William Trueheart. Also, we extend special thanks to our consultants, Daryl E. Carlson, James Farmer, and Wayne Kirschling, and to our secretary, Mary Sanderson.

Final Report

"The Development of Institutions of Higher Education: Theory and Assessment of Impact of Four Possible Areas of Federal Intervention" (62 pages, $2.50)

Appendices

A. Legislative History of Title III

"The Evolution of Eligibility Criteria for Title III of the Higher Education Act of 1965" by Frederic Jacobs and Tyler Tingley (61 pages, $2.50)

B. Theories and Measures of Institutional Development and Review of Previous Studies

"Institutional Development In Higher Education: A Conceptual Framework For Evaluation" by Edward P. St. John and George B. Weathersby (51 pages, $2.25)

C. Descriptive Analysis of Institutional Change

"Descriptive Analysis of Institutional Change Using HEGIS, CFAE, and Title III Data Bases" by Edward P. St. John, Tyler Tingley, and Joan Gallos (94 pages, $3.50)

D. Review of Cost and Efficiency Research

"A Review of Production Function Estimation for Higher Education Institutions" by Daryl E. Carlson (122 pages, $4.25)

E. Financial Aid and Student Enrollment

"Financial Aid and Student Enrollment" by Gregory A. Jackson (30 pages, $1.50)

F. Description of Merged Data Base

"Description of Merged Data Base" by Gregory A. Jackson (3 pages, $ .30)

G. Production Function Analysis

"Production Function Analysis in Higher Education: General Methodology and Application to Four Year Black Colleges" by William Trueheart (50 pages, $2.25)

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EXECUTIVE SUMMARY

We believe there are four areas of college and university characteristics which are relevant to the broad policy concerns of the Title III, "Developing Institutions," program. These four areas are: (1) the structural development of colleges and universities; (2) the levels of various collegiate activities such as the number of students, faculty, library volumes, or terminal degree recipients on the faculty; (3) the relative efficiency with which colleges and universities provide instruction and, where appropriate, public service and research; and (4) the determinants of student demand with a special focus on those institutional actions which affect individuals' college going choices. It is very important to be clear about these four areas when stating objectives, organizing a funding program, selecting evaluation criteria, collecting program data and reaching conclusions about program effectiveness. In the past decade the rhetoric of Title III has been almost entirely about structural development (area 1); the eligibility criteria have all been activity indicators (area 2); there has been little focus on relative efficiency (area 3); and one of the major effects attributed to the Title III program, the increased enrollment of low income and ethnic minority students, is probably more appropriately attributed to the massive increases in federal student assistance (area 4).

Furthermore, our research and that of others suggest that these four areas may be largely independent. That is, that colleges can mature structurally without becoming larger or more expensive. Similarly, colleges can undertake more activities without structural change or increased efficiency. In practice, generous grant programs may reduce the rate of

structural development and/or remove the incentives for efficiency while simultaneously increasing the levels of institutional activities. If the assumption is that higher institutional activity levels attract students and serve a previously neglected clientele, there is no supporting statistical evidence for this assumption. If the expectation is that Title III funding enables colleges to expand their activity levels faster than they would otherwise, there is also no supporting evidence for this expectation (among Basic Program funded schools).

There are currently no measures of structural development collected and reported by the Title III program and, therefore, we are not able to reach any conclusions about this area.(1) In the absence of these data, we cannot test statistically the relationships among the four areas. What we do conclude from our own research and our analysis of previous research is:

- These four areas should be recognized explicitly in any program design and evaluation of Title III;
- Title III Basic Program funded institutions have activity levels not meaningfully different from colleges which were not funded or never applied;
- Colleges providing apparently similar services have wide variations in resources used suggesting that significant improvements in efficiency are possible if encouraged; and
- Public programs aimed at increasing the attractiveness of colleges through increased college activities and/or through increased financial aid should be considered as alternatives and analyzed jointly. Our statistical results indicate that student aid policies have a greater impact on student attendance decisions than do college characteristics, especially activity indicators.

II. INTRODUCTION

Title III of the Higher Education Act of 1965 authorized federal financial support of "developing institutions" of higher education.[1] Financial assistance provided under Title III, Strengthening Developing Institutions, was similar in form to the general institutional support provided through the two Morrill Acts. However, it departed significantly from the student assistance and the categorical contracts which had characterized most previous federal assistance for higher education.

Over the past decade the Developing Institutions program has become the major federal medium to support institutions directly, assisting one quarter of the higher education institutions in the United States. More recently, the Education Amendments of 1972 (as amended in 1976) have extended a philosophy of general institutional support beyond developing institutions to encompass all institutions meeting desired criteria. While these new institutional support provisions have not been funded, they manifest institutional support as a policy of accomplishing national objectives in higher education.

The present study grew out of two general concerns: How does one conceptualize developmental sequences for institutions of higher education? If such sequences exist, how does outside financial assistance alter the rate at which institutions progress through these sequences? More generally, how effective is federal institutional assistance in accomplishing national objectives for higher education such as student access and choice, program and institutional diversity, and institutional growth and survival? We cannot fully answer these broad questions, but we do suggest a framework

within which answers can be sought.

The essence of our framework is that there are four areas in which objectives for funding programs should be specified, and to which evaluative criteria should be applied. These four areas are: (1) the structural development of colleges and universities; (2) the levels of activities within colleges (students, faculty, courses, degrees, etc.); (3) the relative efficiency of resource use; and (4) student choice, including the impacts of college characteristics. The next four chapters address these four areas in sequence.

It is important to point out that this study does not evaluate program management by the Developing Institutions Division of the U.S. Office of Education nor the specific guidelines they are now employing. Instead, this study focuses on the effects on colleges and universities of receiving Title III funds. We have studied existing data bases, historical documents on Title III, and literature on institutional development and institutional resource use. We have used these to explore the impact of federal funds on the structural development of institutions, on institutional activities, on the efficiency of resource use, and on student decisions about higher education.

Context of Evaluation

The context in which we now review the consequences of Title III differs drastically from the mid-1960's context in which the Congress enacted it. At the time there were a burgeoning economy and low unemployment. Student unrest and the Vietnamese War were not yet major diverse issues. Enactment of civil rights legislation was a major national issue: the New Frontier, the Great Society, and the War on Poverty were major banners of activist government intervention. In 1965 there were explicit federal

concerns for black colleges, although the legislative language called them institutions "out of the mainstream." There was an idea that unaccredited colleges, if given a small amount of federal assistance, might become accredited and thereby expand the number of accredited educational opportunities. Moreover, during this period of increasing enrollments, student access and choice could be facilitated by strengthening existing institutions (only institutions at least five years old are eligible for Title III) to complement the increasing number of new institutions, particularly in the public sector.

By the late nineteen-sixties and early nineteen-seventies the concept of federal support to developing institutions had expanded to encompass six to seven hundred public and private, two- and four-year institutions annually. The U.S. Office of Education gradually codified the vague eligibility criteria contained in the legislation and institutions meeting these criteria began to view the program as an entitlement.

A countervailing force to the entitlement concept was that of a developmental sequence. If funds were awarded to enable colleges to move along a sequence of development, would not some colleges ultimately develop and no longer need federal funding? This argument yielded the Advanced Institutional Development Program, intended for institutions which had received one or more years of Title III funding and advanced to a point where three to five years of additional funding would enable them to enter the "mainstream" of American higher education. This program essentially doubled the funding of Title III, from 55 to 110 million dollars a year. "Advanced" institutions were only to be eligible to receive advanced funds, and presumably any Title III funds, for a total of five years. However, this "up and out" phenomenon has not occured, and probably will not occur under the revised Title III guidelines.

As a result, after a decade the Title III program constitutes a natural experiment of providing financial assistance to colleges and universities to alter their developmental pattern or increase the delivery of services to their clientele. The program was not consciously designed thus; there was no carefully randomized control group, and "treatment" has been very idiosyncratic. However, there is adequate variation among the non-applicant, applicant, and funded populations to provide some insight into the impact of a general funding program. In this context we established our approach and methodology for this study.

In addition to this introduction, which outlines the plan and major caveats of the study, this report summarizes the results of our investigations into the impact of Title III on funded institutions. Succeeding chapters of the report discuss sequences of development, the impact of Title III funds on institutional activities, methods of assessing efficient resource use, and the possibly confounding student-aid effects on student choice. Each of these topics is treated in more detail in the various appendices; the last receives extensive treatment in a separate technical report.

Study Approach and Methodology

From the beginning, this study was limited by USOE to the use of existing data. We first identified all the existing national data bases which might shed some light on the institutional or student characteristics in higher education. Appendix F and the corresponding technical report give a complete description of the data bases we obtained and of the final integrated data base which we developed. All of the national surveys have been organized by topics, such as finance, enrollment, racial and ethnic composition of the student body, and earned degrees. These surveys have been administered in different years with varying longitudinal consistency.

We reorganized existing data bases so that all data pertaining to a single institution would be assembled as compactly as possible in one place. The sheer volume of data on each institution (over 40,000 characters) made it impracticable to create one record for each institution, but we came rather close to this ideal.

At the same time, we reviewed existing theories of institutional development which might be relevant to colleges and universities. Drawing upon previous studies of the Developing Institutions programs, and more fruitfully upon the general literature in organizational development, we developed a three-stratum framework for describing sequences of structural development in areas relevant to postsecondary education. The literature review and the detailed description of these theories of structural development constitute Appendix B. We identified from previous studies, the general literature, and the programs' own eligibility criteria a series of institutional characteristics which would be appropriate to the study of institutional development.

A small subset of these characteristics actually existed in the national data bases, and we analyzed these. At the descriptive level, we wanted to know whether Title III applicants differed substantially from non-applicants, and whether schools which received Title III funding differed substantially from applicants not funded. We developed an ad hoc measure of meaningful difference to determine whether distributions on each characteristic overlapped or differed for these groups. (Because we were dealing with the entire universe of higher-education institutions, traditional statistical sampling measures are not appropriate. Appendix C describes our analytic procedure in detail.)

Our descriptive analysis provides some evidence whether providing

direct financial assistance to institutions produces observable changes in their characteristics. It is not, however, sufficient to answer more complicated questions related to resource use. We were interested in the relationship between Title III funding and funds from other sources. Does the receipt of Title III funds result in an increase or decrease in support from other sources? How efficiently are institutions using the resources they now receive? Are there rearrangements in these resources use patterns which could result in greater efficiency, with or without changes in a college's developmental sequence?

Since most of the funds of Title III recipients are primarily engaged in instruction and community service rather than research, we were also interested in student choice. How are student choices about whether to go to college and which college to attend related to institutional characteristics? In terms of student access and choice, what have been the relative impacts of federal student assistance and federal institutional assistance? We could not address these questions directly, but we did examine the effects of financial aid offers high school graduates postsecondary decisions in 1973.

Cautions to the Reader

One major constraint of this study is that at Government behest it was limited to existing data. While large amounts of data on institutions and on students have been collected, few measures relevant to institutional development have been collected and reported nationally. Furthermore, the data previously collected display many inconsistencies over time and among institutions in terms of definition, collection procedure, reporting accuracy, and many other characteristics. As described in the appendices, it was

necessary to edit the data files received from various federal agencies to eliminate obviously erroneous data. While this process has been carefully documented, there is still room for error both in those data elements which were retained and in those data elements which were eliminated. Thus our statistical results are far from definitive.

Since the data were collected at the institutional level, we could not analyze intra-institutional differences in patterns of development or efficiency of resource use.

Our statistical procedures are at best correlational and provide no evidence of causality. This point is particularly important for the analysis of substitutive effects. We have tried to restrict our conclusions to statements of association rather than inferences of causality, although we know that for public policy purposes causality is the major concern. At the same time, we have presented a theoretical construct of patterns of institutional development to inform judgments of causality from our data on association.

The reader should keep these shortcomings and uncertainties in mind as he or she proceeds. However, our conclusions have policy implications which we summarize in the concluding section. The limitations are important, but it is equally important that the reader not lose sight of the overall perspective.

III. SEQUENCES OF STRUCTURAL DEVELOPMENT

Most higher education institutions enroll students, hire faculty, acquire library volumes, construct and maintain facilities, employ staff, enter into contracts, and undertake myriad other activities. Without external financial support, there are limits to an institution's ability to undertake these activities given only a paying student clientele. As a matter of public interest, state and national governments support directly the public institutions which enroll over three-quarters of the college and university students in the United States. To a much lesser extent, there is direct public support for the private or independent institutions which enroll the remainder. Most public policy toward higher education is aimed at expanding institutional activities, including community service, research and development, special services for educationally-disadvantaged individuals, health-science professional training, and a variety of specially-targeted programs. Similarly, publicly provided student assitance expands individuals' financial capacity to attend collegiate and other postsecondary education, and therefore should increase the proportion of adults who take advantage of their postsecondary educational opportunities. Again, this strategy will, if anything, increase institutional activities. With the American penchant for growth, public support has primarily been available to expand activity levels, not to contract them.

What distinguishes Title III from other Federal programs is the premises of institutional development on which the Developing Institutions program is based: structural development is possible, direct federal

support can influence the rate of structural development, and more evolved forms of structural development are preferable in terms of public policy. Thus the program should develop capacities within institutions as well as expand activities. However, it has been difficult to implement this concept, and the indicators used to determine eligibility and disburse Title III funds measure activity rather than structural development.

We began our investigation into institutional development by considering observable sequences of structural change. Do colleges and universities progress through a series of structurally different stages of development, or do they simply undertake more or less of a variety of activities? If there are distinguishable patterns of structural development, are some more stable, capable of dealing flexibly and resourcefully with the financial exigencies of an uncertain future? Or is an institution's ability to make choices about its future virtually unaffected by its pattern of development? If general sequences of structural development exist in colleges and universities, can interventions by outside agents, such as the federal government or philanthropic foundations, affect either the rate or the sequence of development? Does an institution's structural development affect the delivery of services or the efficient use of resources to accomplish its objectives?

These are key questions for public policy toward institutional support. They are also difficult questions to answer. This report initiates answers to some of them. We present here some important dimensions of structural development and suggest measures which might indicate the extent to which institutions are involved in these processes.[2] In summary, we believe that:

(1) there are distinguishable structural patterns of development, especially in the areas of technology and decision making;

(2) these patterns of structural development do affect the efficiencies of resource use and the capacities of institutions to deal with the financial and other crises which beset them;

(3) some forms of outside assistance may help institutions change their patterns of development;

(4) activity expansion may induce structural development, but not necessarily of institutional capacities to cope with crises other than growth; and

(5) general subsidies may enable institutions to postpone institutional transformations necessary for adaptation to new, long-term demographic and economic conditions.

In this section we consider three views of structural development for colleges and universities: shifts in the technologies of instruction and management available to higher education institutions; the sequential development of institutional decision structures; and patterns of qualitative development in institutional instruction and decision process. Finally, we assess existing measures of institutional change in light of this three-level framework.

Developmental Patterns of Technological Change

The instruction, research, and public-service functions of colleges and universities are constrained by prevailing technologies. Lecture instruction, for example, reflected the dearth of reading material: only hand-copied books were available, so the lecturer or reader would stand in front of the class and read from the book. The printing press and the

photocopy machine now enable each student to have his or her own copy. The size of the audience was initially limited by the range of the human voice; today, telecommunication provides virtually limitless audiences. Neither of these potentials is often realized. The computer has made possible a scale of numerical calculations for statistics and mathematics unheard of two decades ago. The same can be said for a number of computer-based managerial advances in college and university administration. The important point here is that the rate of technological advance does not depend on the organizational development of colleges and universities. On the other hand, the structural development of colleges and universities does depend substantively on the rate of technological development. For example, in television based institutions, the patterns of institutional development have been and probably will continue to be different from those of a face-to-face instructional college.[3]

The discussion of this view is based on W. W. Rostow's (1960) stages of economic growth. Rostow's model is based on changes in the dominant technology being employed in the economy of developing nations. This model can be used to consider the implications of current shifts in technology on the higher education industry as a whole.

Rostow's concept also provided the intellectual basis for the stages of college and university development proposed by Hodgkinson and Schenkel (1974) in a previous study of the Title III program. There is an understandable appeal in dividing institutions into stages called preconditions for take-off, take-off, drive to maturity, and high mass consumption. Although Hodgkinson's model used this terminology, it did not take into account shifts in use of technology and the resulting distributions of income, labor, and capital. It is difficult to apply these economic concepts

to educational institutions because most have essentially the same technology, or at least the same technological possibilities. It is very difficult to distinguish the technology of instruction used at a "well-developed" institution from that used at a "developing" institution.

In the "academic procession" there are a few leading institutions which establish the dominant pattern and technology of instruction followed by most other institutions.[4] It is unlikely that the application of different technologies in existing institutions either reflects or causes different patterns of institutional development. For example, if an established campus adopts new technologies, like computers and television, it is not likely that the dominant mode of pedagogy will change. Therefore, it is unlikely that changes in technical possibilities or in the application of technology to education will have a substantial impact on the structural organization of educational institutions.

Structural Patterns of Decision Making

A second way of understanding patterns of institutional development is to focus on the making and implementing of decisions rather than the output-producing processes such as instruction, research, or public service. The research of Larry E. Greiner (1972) and others suggests a developmental sequence in the decision making patterns of institutions of higher education.

Colleges and universities tend to emerge through a series of phases: a creative phase with a small number of individuals organized to accomplish a particular task; a direction phase in which the beginnings of functional specialization occur in academic as well as administrative arenas; a delegation phase which has extensive differentiation of academic and administrative functions and specialties; a coordination phase in which new

administrative planning and analysis structures emerge and policy formulation becomes distinct from policy implementation, at least formally; and a collaboration phase in which individuals play multiple roles and at the same time integrate the concerns for policy formulation and policy implementation. These phases are points along a continuum and not distinct categories; they represent common clusterings of characteristics rather than precisely differentiable forms of organizations. Transitions between phases often occur, at least in theory, as part of the resolution of problems generic to each phase. In addition to the substantive problems which face an organization, there are also problems inherent in the organization structure by which substantive decisions are implemented. These inherent "managerial crises" provide both a threat to organizational survival and an opportunity for organizational growth.

According to this perspective, creative organizations are typically very informal; policy formation and decision making occur over a cup of coffee or around the water cooler. Implementation is similarly ad hoc. Frequently a charismatic leader is the major stimulus for the formation of a new organization. Moreover, individuals who forsake more traditional alternatives to commit their energies and efforts to a new venture need substantial degrees of personal autonomy.

The creative phase, with its informal administrative structure and style of decision-making, typically confronts a crisis of leadership. It is essential for someone to speak for the organization when financial crises severely threaten the continuation of the status quo, when student unrest brings increased political pressure from government or trustees, or when anything places severe strain on the decision-making process of a creative organization. The decisions of who is in charge, who can commit

the future course of theorganization, and who defines the vision and the mission of the organization resolve the crisis of leadership. If internal dissension is high and the crisis is severe, creative organizations might split into several smaller units instead of resolving the crisis of leadership at the entire organizational level. Alternatively, they could choose to have key leaders differentiate their roles along a variety of areas within academic and administrative affairs, and between administrative affairs and policy oversight, so it is clear who speaks about what for the organization. This is the beginning of a directive structure.

Directive structures, in turn, confront the crisis of autonomy. This occurs when individuals find the visions which originally attracted them to the organization are no longer widely shared among the administrative officers, their own sphere of action is being circumscribed, and their ability to be a free agent and yet participate in every decision has been greatly reduced. At this point many key people may leave seeking a more receptive environment elsewhere, or start their own organization. To adjust, the college or university may increasingly differentiate the functions to give each actor his or her own turf. This highly delegated structure, resembling the multiple departments in even our smallest liberal arts colleges, is a structural response to the crisis of autonomy.

The crisis of control tends to occur in a delegated structure. Increases in the number of actors with powers of initiation, the distance between the operating and the policy levels, the formality of interaction, and non-faculty and non-policy staffs in the middle management of an institution raise the probability that trustees and chief executives will view the organization as being out of control. In this context, control relates to the degree of congruity between the goals and purposes of the

institution and the activities followed by the members of the institution. As the complexity of an organization increases, so does the likelihood that the whole is far less than the sum of the parts. With increasing formalization, the major response to the crisis of control is to create another level of bureaucracy with the purpose of planning and coordination within an institution.

The red-tape crisis results from successful implementation of the coordination phase. As the proportion of total resources devoted to administrative overhead increases in an organization, it becomes increasingly clear to most observers that a more efficient way has to be found both to coordinate the activities of an institution and to reduce the administrative overhead costs. This is the basis of a collaborative organization which, in many senses, may resemble the creative organization.

This spiral evolution, coming full circle but slightly displaced in terms of structural development and capacity, may be followed by many organizational subunits as well as by entire organizations. There is no "best" level of development. Neither is there any assurance that a particular crisis once resolved will not recur or that the resolutions found are entirely appropriate. The theory leaves unspecified the appropriate match between style and type of leadership and the structural phase of an organization. There appears to be a direct relationship here, but the available research is far too limited to say what it is.

While there is neither evidence nor reason to suggest that more evolved stages of development are better, the differences of perspective associated with each stage may be helpful in understanding organizational crises. For example, a college president might view faculty workload as an issue reflecting a general, underlying concern for accountability,

perceive it as a crisis of control, and therefore advocate a planning or coordinating structural response. On the other hand, faculty might well interpret the institution to be in a crisis of autonomy and react by demanding a more delegated structure. An unresponsive administration might find itself in a collective bargaining situation which solidifies a delegated structure. The substance of an issue might appear to be the same from two perspectives but the organization's structural context (or prevailing crisis) may be perceived to be very different from different perspectives.

Sequential Development of Interpersonal Systems

A third way to understand patterns of institutional development is to focus on the interpersonal relationships that are at the heart of educational enterprise--relationships among students, faculty and administrators. Qualitative changes in the interpersonal dynamics and decision-making process operating on a campus are related to, although not necessarily dependent on, the development of new learning technologies and more differentiated administrative structures. The literature on organizations calls bureaucracy an advanced form of organizing interpersonal relationships, and depicts it as a system of defined relationships, roles, and procedures. Most campuses are successful in developing to a bureaucratic stage, but few move beyond it. Recent history suggests, however, that students and others on many campuses have become dissatisfied with this mode of organizing, and indeed several organization theorists suggest that there is a more advanced form of organizing than bureaucracy.

Especially during the past decade, campuses have experimented with qualitatively different patterns of organizing. They have modified existing structures and programs by placing more emphasis on individual

students' learning goals than on predefined educational requirements and on developing collaborative, rather than authoritative, methods of decision-making. This has yielded experiments with post-bureaucratic forms of organizing, known variously as "snared authority," "beyond bureaucracy," or "openly chosen structures." William R. Torbert's (1974/75) concept of openly chosen structures can be applied to higher education. Openly chosen structures require higher-education institutions to hold an atypical set of values. Ironically, in many ways, openly chosen structures in higher education would not differ drastically from those dictated by now-forgotten mid-nineteenth century concepts of liberal education: organizing the curriculum to enhance the moral development of students; providing educational experiences that help students adjust to numerous future career options; and creating an environment that encourages higher quality, ongoing exchanges and relationships among students and faculty.

The qualitative factors distinguishing an organization with openly chosen structure from one operating in predefined-productivity or bureaucratic stage can be considered measures of viability for institutions and programs, in that institutions that explicitly examine their relations with external communities and organizations are more advanced. Although it is not necessary according to Torbert's description, in our opinion institutions that involve faculty and students as well as administrators in policy formulation and implementation decisions are also more advanced. Increased student and faculty participation can concomitantly increase commitment to the institution. When an institution's students and faculty feel committed to a new program because of their involvement in it, the program may have a greater impact than one with a limited investment on the part of the individuals it is supposed to benefit.

Openly chosen structure also emphasizes interpersonal relations and the development of the individual. In higher education researchers have long paid attention to the students' maturation and intellectual growth, and therefore many institutions consider these factors when developing programs. Educational programs' ability to meet the educational needs of individuals at different stages of development have been a more recent concern. And there appears to be a parallel concern about faculty and administrators' development. Consideration of what institutional plans and their implementation imply for the development of individuals in the institutions--whether through educational programs for students or staff development for faculty and administrators--may be an increasingly important measure of institutional and program viability in the future.

For the modern campus, openly chosen structure can take the form of individually centered rather than institutionally centered curricula; developing procedures that encourage the involvement of students as well as faculty and administration in decisions that directly affect them; and considering campus decisions in light of community as well as campus interests. Enhancement of how people learn is, after all, a major objective of most collegiate education. Although central to the purposes of the institutions, these interpersonal dynamics are very removed from federal decisions and are the least likely to be influenced by federal interventions.

Possible Measures of Structural Development

In the following discussion of measures, we suggest a series of indicators appropriate to the three types of institutional development. We offer these tentative measures more to widen vision and make specific some of the developmental concepts than to propose a formal extension to

what is already too large a data collection effort at the national level. If these measures could only capture the intuition and common sense of experienced observers, they would be very helpful in understanding the complex patterns of institutional development.

The first set of measures in Table I relates to the development of the technology used by institutions. Technological development in its broadest sense refers to the relative sophistication of the means used in institutional activities. It includes both traditional and nontraditional teaching, service, research, and management activities. The first dimension relates to observable characteristics of institutional activities, including such quanitative measure as enrollment, number of faculty, faculty with doctorates, faculty salaries, and library volumes. The technological characteristics have been further broken down into two categories, hardware and software. Software comprises development in instructional programs--basic skills, individualized instruction, work experience, and assessment of prior experience. Hardware, in contrast, refers to the use of equipment (e.g., television, film, and computers) in the instructional delivery process. Closely related but nevertheless distinct is the relative efficiency with which institutions and institutional programs use resources.

The phase of development of an institution's decision structure and the appropriateness of the management system to that phase can be described by a second set of measures. Phase can best be assessed either from institutional case histories or by identifying the types of managerial crises that predominate: leadership, autonomy, control, or red tape. Considering the types of crises facing an institution can have useful implications for institutional management as well; a predominance of one type of crisis suggests an institution's decision structures and information

system may no longer be the most appropriate.

The development of interpersonal processes in the institution and its programs--that is, the openness of the system and its impact on individuals in the institution--can be identified by a third set of measures. Subjective judgments by students and surveys by social science professionals measuring individual change can be used to evaluate program impact, while case histories, analysis of decisions, and examination of the governance process (participation in policy making and implementation) can be used to evaluate openness. Qualitative changes are the most difficult of the three types of development to measure usefully for evaluation, but they are important nevertheless.

Relevance for Policy

For every policy action directed at a perceived deficiency in a college or university's activities, there is, almost as if it were a social law of motion, some kind of reaction among the structural characteristics of that institution. This reaction may contribute to the purposes of initial action, but we suspect the structural consequences of most activity-oriented policies are both unplanned and unperceived. Thus, increasing the income of the institution for a short period of time, which is an activity-directed intervention, might not alter the institution's pattern of development or even its level of service. Similarly, one must not assume that increasing the level of service--for example, meeting all enrollment demands--positively affects the structural development of the institution.

These different perspectives on development suggest some ways in which outside agents could intervene constructively in the developmental sequence of a college or a university. The most effective strategies would

differ, depending upon the sort of development one wants to affect. Purely financial changes are unlikely to lead systematically to evolution along any of the developmental dimensions discussed in this section. It is very likely, however, that changes in financial conditions will produce or reflect changes in institutional activities, on which we focus in the next section.

IV. ACTIVITY INDICATORS FOR COLLEGES AND UNIVERSITIES

From the legislative origins of Title III to the present, the Developing Institutions Program has been greatly concerned with institutional activities, whether or not they reflect development. In this section, we examine the activity indicators which the Office of Education has used recently to determine institutional eligibility for Title III funding. These indicators are given in Table 2.

Using Title III application data, we compared the activity characteristics of institutions which received funding to institutions that did not. Using Higher Education General Information Survey (HEGIS) data for virtually all institutions of higher education, we compared institutions which did not apply for Title III funding to applicant institutions, both receipient and non-recipient.

In essence, we were trying to determine whether the program distinguished categories of institutions according to the activity indicators used for eligibility. Using the same data plus additional information on private giving, we also examined interrelationships among sources of income to see whether the receipt of Title III funds affected the magnitude of funds received from other sources.

It is important to understand that from the beginning of the activity analysis we were not attempting to discover those institutional characteristics which do distinguish Title III funded from all other institutions. Essentially, the quanitative analysis of institutional data could be used for at least two purposes: to determine those correlational

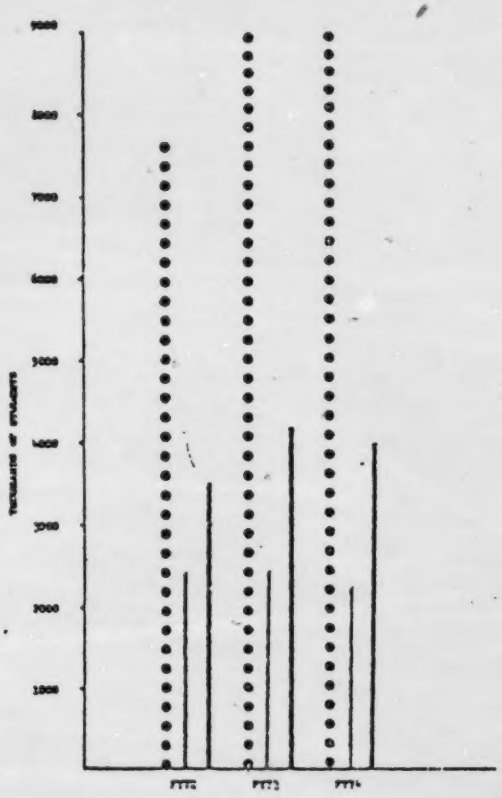
factors which "best" describe or predict the funding decisions of the Title III program staff or to determine whether the Title III program eligibility criteria meaningfully distinguish non-applicant from applicant and recipient from non-recipient institutions. Consistent with our overall study design in which we were not evaluating program management, we have not developed a statistical model of program funding decisions among eligible institutions.[5] What we have focused on is whether the eligibility criteria, which are all activity measures, actually sort institutions out into substantively different groups, whether the recipient institutions have activity measures similar to non-recipient institutions, and whether over the five years of data we examined the activity measures of the recipient institutions changed at a rate appreciably different from the rate of change of activity measures of the non-recipient institutions.

Findings of Descriptive Analyses

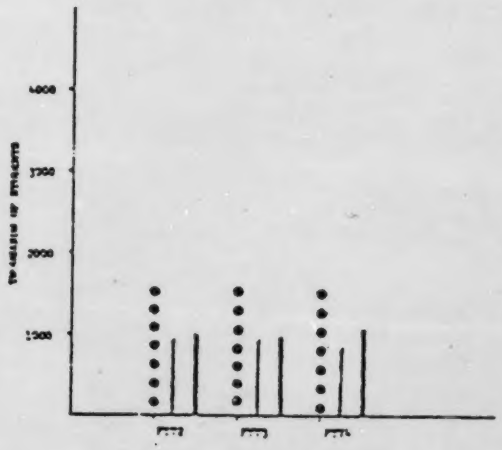
When the level (two-year or four-year) and control (public or private) of institutions were taken into account, the three activity indicators used as eligibility criteria by the Title III program and also available from HEGIS, consistently showed the non-applicant group to be larger in total FTE enrollment and educational and general expenditures. However, there were no meaningful differences in the ratio of educational and general expenditures to FTE enrollment for the four institutional groups examined (Figures 1, 2, 3). Although these institutions appear different when means are compared, tnese differences are neither substantial or meaningful in light of the within-group variation. Further detail is available in Appendix C.

Figure 1

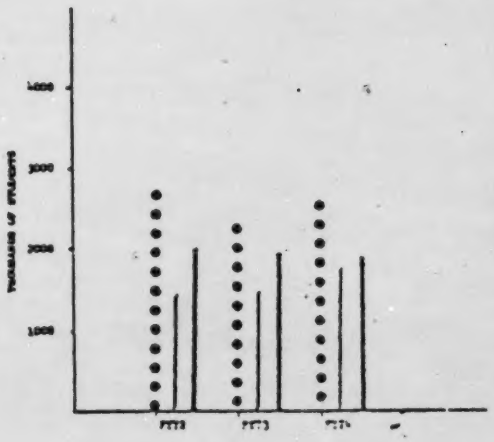
Generated Total FTE Enrollment



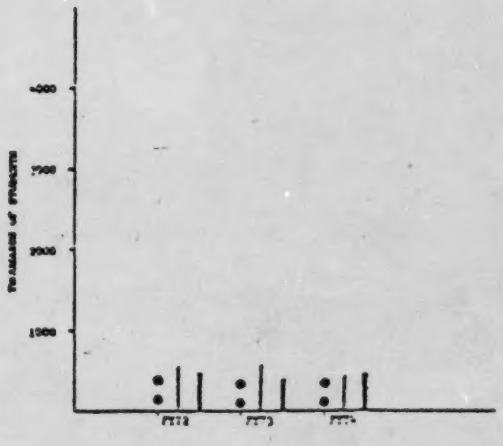
Public Four Year



Private Four Year



Public Two Year

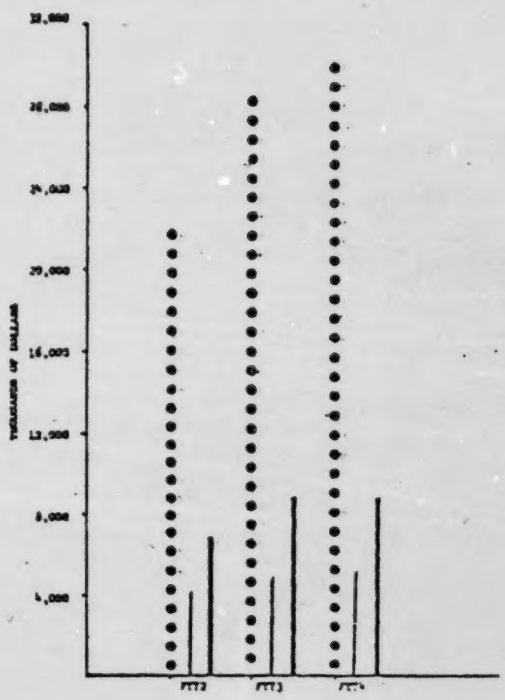


Private Two Year

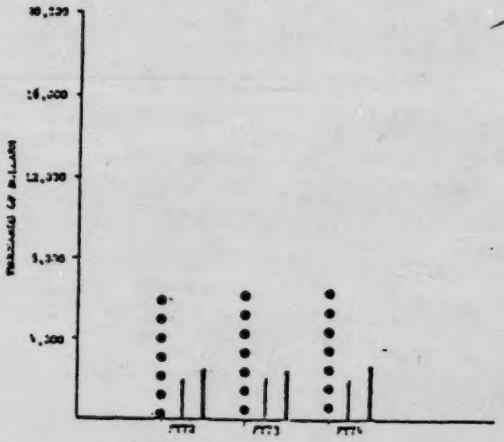
Source: HEGIS Data Base

Figure 2

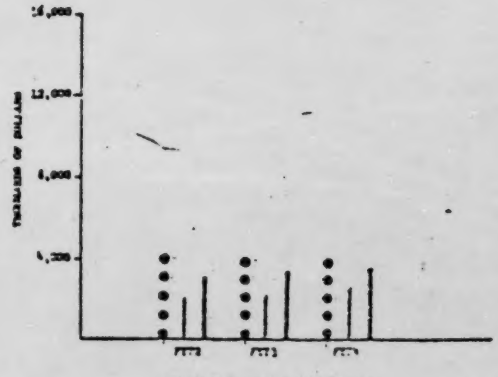
Total Education and General Purpose



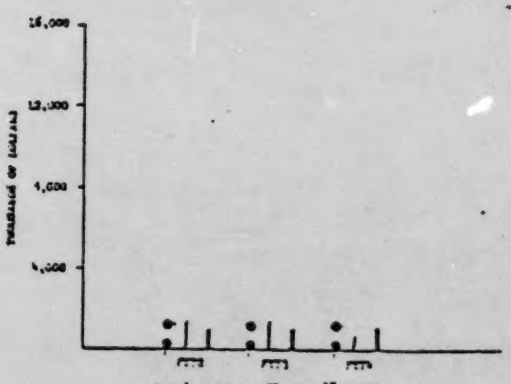
Public Four Year



Private Four Year



Public Two Year

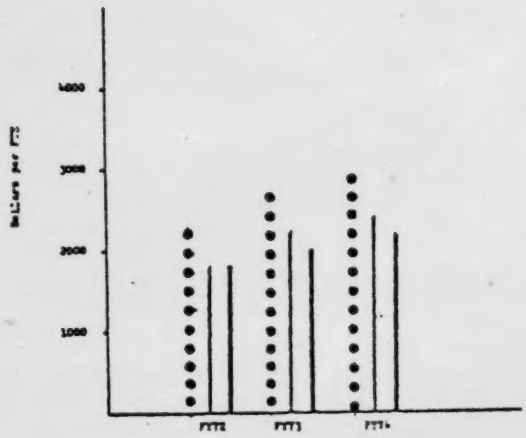


Private Two Year

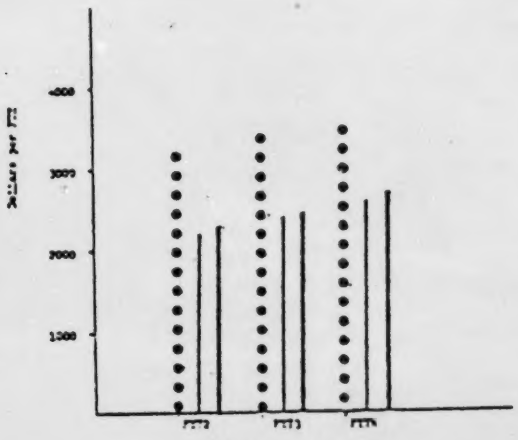
Source: HEGIS Data Base

28 Figure 3

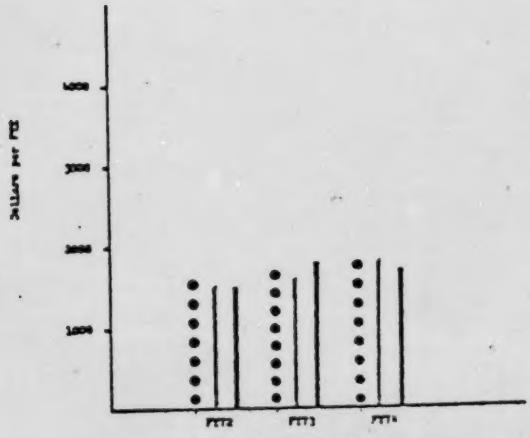
Education and General Purpose Expenditures/
FTE Student



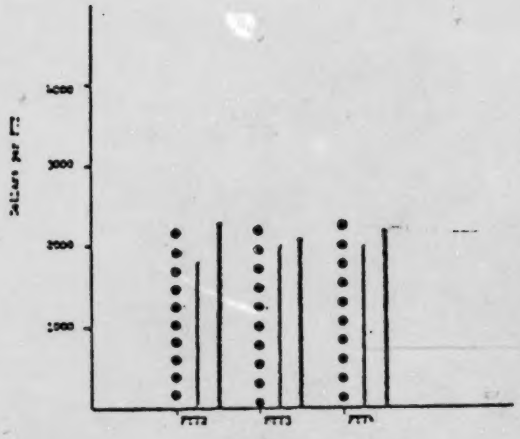
Public Four Year



Private Four Year



Public Two Year



Private Two Year

Source: HEGIS Data Base

The recipients of Advanced Institutional Development Program (AIDP) funding, on the other hand, clearly differed from other institutions. AIDP institutions enrolled more students, spent more, possessed larger library collections, employed a higher proportion of faculty with doctoral degrees, and so forth than institutions funded in the Basic program or non-funded applicant institutions (Table 3 a-h). Subsequent analysis comparing funded and non-funded AIDP applicants substantiated this general finding. AIDP-funded institutions were again consistently larger on most characteristics. These latter findings are slightly misleading, however, because institutions could apply for both the Basic and Advanced programs for the years covered by our data. Often, applicant institutions denied funding under the Advanced programs were funded under the Basic Program (see Appendix C).

We have observed the three categories of institutions--non-applicants, non-funded applicants, and funded applicants--over a period of three to five years based on existing data. During this time, the Title III recipient institutions indicate increasing activity levels: increasing enrollment, increasing total budget, increasing library holdings, increasing proportion of faculty with doctoral degrees, and so forth. However, during the same time period, non-funded applicant institutions and non-applicant institutions showed a very similar pattern of increased activity levels. (Again, see Appendix C for a full data presentation.) In summary, there is no evidence to suggest that Title III recipient institutions have increased their levels of activity at a rate any different than other institutions of higher education.

Institutions of higher education have many sources of funds including: federal, state, and local governments, students, endowment,

gifts, and revenues from auxiliary enterprises. We examined the interaction among these income sources by calculating the simple correlation coefficients among all the sources of income for all Title III institutions reporting data, classified by Carnegie category and control. Table 4 sumarizes our results. With relatively few exceptions, we observed positive correlations between other sources of income and Title III funding. With the exception of alumni gifts to private liberal-arts colleges, which were negatively and substantially correlated with Title III funding, all the other sources appear to vary positively with the Title III funding. This suggests either that institutions which successfully obtain Title III funds also obtain funds from other sources or that institutions' ability to secure funds from other sources is enhanced by the receipt of Title III funds. In fact, most correlation coefficients were positive. That is, institutions which secure income from one source also secure it from most others. In any event, there appears to be very little substitution of Title III funds for funds from other sources; apparently the federal government is indeed increasing the resources available to an institution rather than simply changing distribution of sources.

We recognize that activity indicators provide little information on the actual patterns of institutional development. However, they have been used to assess program eligibility and, for that reason, their distribution merited investigation. We found that:

(1) While institutions which do not apply to the Title III program tend to be larger than applicant institutions in both FTE enrollment and educational and general purpose expenditures, they are not meaningfully different in the ratio of expenditure to enrollment.

(2) Basic-funded institutions' activity indicators increased over the past five years, but at about the same rate as non-recipients.

(3) AIDP recipients are meaningfully different from institutions funded in the Basic Program and from non-funded institutions. AIDP recipients tend to be larger on almost every indicator than those schools which were denied funding.

(4) There is little evidence of substitution among income sources in response to Title III; there is some evidence that Title III funding does increase the total amount of resources available to the institution.

V. EFFICIENCY OF INSTITUTIONAL RESOURCE USE

In addition to concern about structural development, which we could not measure and about increased effectiveness of the institutions, which we could measure crudely using activity-level indicators, a third area of concern is the relative efficiency with which colleges and universities use resources. Effectiveness, to us, is a measure of the degree to which objectives are accomplished, while efficiency provides a measure of the magnitude of resources used to accomplish those objectives.[6] In our general framework, an outside agent such as the federal government can seek to increase the delivery of services by higher education institutions by increasing (1) the rate or congruity of institutional development, (2) the level of activity within the existing state of development, (3) the efficiency with which current institutional technology is applied, or (4) the choice patterns of individuals seeking educational services.

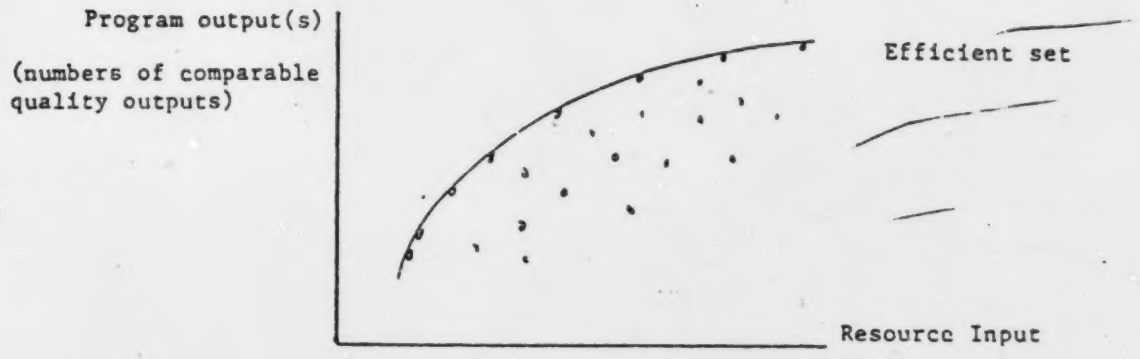
In this section, we discuss some of the available evidence on the relative efficiency of resource use by colleges and universities, particularly as it relates to instruction. For the one or two hundred major research universities, graduate instruction and research greatly confound any attempt to use undergraduate instruction as a primary outcome of the institution. For most other institutions, however, providing direct student instruction is a major activity and therefore outcome of those institutions. The research of the last ten years is described in Appendix D and suggests that it is appropriate to use student instruction as an outcome measure to distinguish institutions which use resources in a relatively efficient manner from all other institutions providing similar services or producing comparable

outcomes. Assessing comparability of outcomes is a long and complicated process still in its preliminary stages of development, but some work has been using Carnegie categories and public or private control as points of departure (see Carlson, 1975, described below).

Institutions providing comparable outcomes typically vary in patterns of resource use. For any given level of total resource input, we will observe institutions providing a wide variety of outcome levels of a given quality, such as the number of students enrolled in various programs. There will be some institutions which provide more of a given outcome than others. We label the set of institutions which provides the most outcome of comparable quality for any given level of input as the efficient set (Figure 4). The efficient set of institutions provides two useful benchmarks simultaneously: the most output observed for a given amount of total input, and the minimum amount of input found necessary to yield a given level of output. Many if not most institutions are below the efficient set; that is, they use more resources than they need to produce the same levels of output. This is not to say that higher education institutions are careless or wasteful, but rather that there have been few incentives to maximize their efficiency. There have been clear incentives, for example, to increase faculty salaries, decrease faculty work load, decrease average class size, and increase student services, some of which also contribute to increased quality of outcomes. But all of these incentives contribute to increased costs.

Most of the previous studies of institutional resource use--unit-cost studies, ratio analyses, and the usual comparative statistics collected and reported by USOE, educational associations, and special studies--have focused on the average use of resources by groups of institutions. By

Figure 4
Efficient Set of Institutions



The Efficient Set comprises those institutions for which no more output can be produced with the same resources and no fewer resources can be used to produce the same quantity of output.

definition, about half of the institutions are more efficient and approximately half are less efficient than the average institution. From a public-policy perspective, increasing the relative efficiency of existing institutions would increase the level of services they are able to provide at current or even reduced levels of resource input. From the institution's perspective, there are obvious incentives for increasing the amount of input for a given level of output because these resource increases are shared in personally by faculty, administrators, and students.

In some analyses, linear programming is used to identify the efficient set, then multiple regression analysis is used to estimate a continuous function through the efficient set which describes how resources can be translated into outcomes--for example, student enrollment outcome (see Appendix G). This approach has been used many times before to analyze industrial production analyses, and on one or two previous occasions to study the outcomes of educational institutions.[7]

While it is difficult to reach general conclusions about all institutions based on the existing literature and on the preliminary analysis we have performed, the previous work of Daryl Carlson (1975) and others substantiates the general finding: a significant proportion of institutions lie below the efficient set and could, therefore, increase their output with existing resources by reorganizing their use of those resources.

For example, Carlson examined 1972-73 HEGIS data by the linear programming techniques of estimating the efficient surface (or frontier) and calculated the results shown in Tables 5, 6, 7 and 8 for 106 private, highly selective liberal arts colleges and for 95 public comprehensive colleges. As shown in Tables 6 and 8, the average institutions spends about 80% more per student than the efficient institutions. Alternatively,

if an average institution spent its resources like an efficient institution it would have about 40% of its cost per student to save or devote to other purposes. The amount of funds absorbed by technical inefficiency, as measured by Carlson, is far greater than even the largest Title III awards to institutions. Furthermore, Carlson shows that his results are relatively insensitive to the proportion of part-time students, the size of the institution, the number of graduate students, or the level of research (Tables 5, 6, 7 and 8).

To the extent institutional effectiveness as measured by activity indicators is a significant goal for public policy, it seems to us efficiency should also be sought. This research gives us some indication that this policy alternatives would be valuable. There is also some evidence that traditional assumptions about the economy of scale and the relative desirability of capital versus operating support for institutions are not completely valid (see Appendix G). At this time, these findings yield questions without definitive answers, in part because of inadequacies in the available data and in part because the requisite analyses go beyond the intended scope of this project. However, these questions can be answered and, perhaps for policy purposes, should be answered instead of continuing to act on the assumptions they challenge.

VI. STUDENT CHOICES AND EFFECTS OF STUDENT AID PROGRAMS

Title III accounts for only about 5 percent of federal spending under the Higher Education Act (as amended). Most of the remainder goes to direct student aid under the Basic and Supplemental Educational Opportunity Grants, College Work-Study, and Student Loan Programs. Each of these presumably has influenced the likelihood prospective students would enroll, and the ensuing changes in enrollment might well have counteracted or enhanced the impact of Title III on institutions' ability to grow.

With a view toward disentangling these effects, we attempted in a sub-study to estimate how student aid programs might have changed enrollment.[8] We estimate federal student-aid programs brought aid to four to nine percent of college applicants who would not otherwise have received aid. This suggests these programs have had relatively little impact on enrollment nationally, increasing the overall attendance rate among applicants by a total of 0.3 to 2.0 percentage points from fall 1969 to fall 1972. (The rapid growth in Basic Educational Opportunity Grants is not reflected in currently available longitudinal data.) Since the enrollment rate actually declined over these years, countervailing forces evidently existed. Institution-specific aid might have helped Title III institutions draw additional applicants, since student aid's competitive effects are larger than its attendance-inducing ones, but it is likely other schools would have done the same and canceled any advantage.

The study provided some useful, interesting descriptions of the forces that move high-school graduates into colleges. First, students' backgrounds, academic performance, and aspirations predominate in students'

decisions whether to apply, how many and what sorts of schools to apply to, and whether or where to attend. This places limits on programs which fail to modify these forces; for example, programs which focus on high-scoring students will eventually yield no new enrollees unless they also increase the stock of such students by improving other students' performance.

Second, fewer than half the applicants apply to more than one school, and those who do so apply to remarkably homogeneous ones. This suggests preselection is a critical stage in the college-going process, and that institutional changes or policies invisible to a student at preselection time will have little impact on where he or she attends.

Third, colleges' admission decisions have very little substantive impact on where students go to college. Under 20 percent of three-application students' first-choice applications elicited rejections. Overall, only about 8 percent of first-choice applications were rejected; only 3.3 percent of students were rejected by all of their choices. The conventional wisdom on this point is that multi-applicants' first choices are seldom fulfilled dreams, an assertion not borne out here. Either the myth has never been true or it has become self-fulfilling at the preselection stage.

Fourth, college characteristics other than financial aid have little effect on students' decisions whether to attend, and only highest offering and financial aid appear to influence selection among several offers of admission. This reflects the preselection phenomenon we mentioned above.

Finally, the effects of financial aid on students' decisions span socioeconomic, regional, and academic-ability boundaries: financial-aid offers increase the likelihood students will attend at all by about

8.5 percentage points and increase the likelihood they will choose a particular school rather than another offering no aid by about 11.5 percentage points. There are undoubtedly extremes for which these amount/eligibility trade-offs are not valid, but these are the effects observed in practice.

Although they provide little of interest to Title III per se, the results of our demand study place fairly strict limits on the enrollment changes to be expected from universal financial-aid programs. In 1972 about 21 percent of all college admission offers were accompanied by aid offers; we estimate that had every admission carried an aid offer enrollment among applicants would only have risen by 6.3 percentage points. Presumably some students would have applied who did not, but it unlikely enough would have done so to change the thrust of these conclusions. Financial aid is on its face an effective way to give money to needy students so that they may attend college if they wish; there is little evidence here or elsewhere that it is an effective or efficient way to induce large numbers of them to do so.

What is of direct interest to those seeking to evaluate the impacts of Title III using the numbers and characteristics of students is that we have no statistical evidence that institutional characteristics beyond the highest degree offered (which sorts out two-year, four-year and graduate institutions) and whether or not aid was offered have any impact on student choice. With over 90% of college applicants admitted to their first choice institutions and over 95% of college applicants admitted to one of their choices, there is also no evidence of frustrated choices or pent-up demand constrained by inadequate institutional resources. The vast majority of college applicants are apparently admitted wherever they apply and go

where they choose. What is not so clear is that individuals' preselections of where to apply are made with full and current knowledge of institutional characteristics, or what the actual effects on preselections depend on the perhaps erroneous information that guides them.

VII. CONCLUSIONS AND RECOMMENDATIONS

In this report we have argued there are four different areas of concern relevant to the history and the practice of the Developing Institutions program. These four areas of concern are: (1) the structural, developmental sequence or sequences which colleges and universities experience; (2) the levels of activities undertaken by institutions; (3) the relative efficiency of resource use by institutions in offering various activities and services; and (4) the institutional and environmental factors which affect student choice both whether to attend some form of postsecondary education and which particular institution to attend. All four of these areas represent important and significant concerns of national policy; all reflect arguments advanced during the legislative debate leading to Title III of the Higher Education Act. To some extent, these areas of concern suggest different bases for program planning and evaluation. One obvious conclusion, therefore, is that planning, program implementation, and evaluation should be done consistently according to the area or areas chosen as the basis for the program. It is inconsistent, for example, to use a set of activity measures for program eligibility and a series of development measures for program evaluation.

The legislative history, program history, and evolution of eligibility criteria all reinforce the conclusion that the current Title III program is focused primarily on increasing the activities of funded institutions. With some exceptions, our basic conclusion is that the quanitative measures of institutional activity available to us show no significant differences between funded and other similar institutions. The notable exceptions are twofold: the Advanced program has funded institutions

which have previously achieved high activity levels, and the Basic program has selected a set of institutions with proportionately greater enrollments of low-income and ethnic-minority students.

This latter observation suggests there is some intention to serve such students, perhaps based on the assumption that institutional characteristics will affect such students' choices whether to attend college. There is no empirical support for this latter assumption.

In our conversations with individuals concerned with this program, a constant theme has been the developmental sequence through which institutions are assumed to emerge. The quantitative data currently available provide no meaningful measures of institutional development. Consequently, we cannot assess the impact of Title III funds on institutional development. However, we have suggested a series of measures which might provide some insight into sequences of institutional development, and we recommend later in this section a pilot testing of these measures to determine the feasibility of a new data-collection and analysis process.

Based on our review of the literature and our own analysis, we see no reason to assume the levels of activity undertaken by an institution necessarily relate to its location on some pattern or sequence of development. In other words, we see no reason to believe that "developed" institutions spend more money per student, have more library volumes, have a higher proportion of faculty with doctoral degress, have a higher proportion of low income or ethnic minority students, admit a higher proportion of clever students, have a larger development office, undertake more curricula reform, or indeed differ on any other traditional activity measures.[9] More important, the converse may equally be true: active institutions need not be developed. Increasing budgets, student enrollments, numbers of faculty, number and variety of courses offered, or any other activity need not cause a change in the pattern of institutional

development.

Although the evidence on institutional efficiency is relatively limited, we believe it is possible to identify institutions which use their resources in a relatively efficient manner to produce observable and measurable outcomes. We believe it is possible to describe these relatively efficient institutions by conventional economic production functions which represent the efficient production possibilities even though most academic institutions share a value system of relatively inefficiency -- that is, administrators and faculty generally seek higher faculty salaries, lower faculty work loads, smaller classes, and lower student/faculty ratios. From the student or government point of view, these pressures against relatively efficient resource use should raise serious questions about tne likely impact of the financial support they provide these institutions as clients.

Following through with a careful analysis of the relatively efficient institutions along the lines we have suggested would provide some indication of the minimum level of support needed for a particular level of activity.[10] The provision of additional resources to expand the levels of activity in institutions is essential only for those institutions that are relatively efficient. One obvious public strategy would be to provide information about the variety of resource-use characteristics of institutions along the efficient surface and to predicate financial support to institutions on the capabilities of the relatively efficient institutions, thereby creating some incentive for other institutions to use their own resources more efficiently.

While colleges and universities have many complex and sometimes conflicting purposes, one common objective is to serve students who seek to continue their eduction at the collegiate level. In the last decade maximizing student access and freedom of choice have become important objectives to institutions and to state and federal funders. Although research on the

determinants of student choice is relatively recent and still quite limited, the available evidence suggests that institutional characteristics play a relatively small role in individuals' choices (or preselection) whether or where to secure higher eduction. On the other hand, pricing and financial-aid decisions of institutions and governments appear to have some impact on student choice. The available evidence indicates that student financial aid is likely to be much more efficient means to use public money to alter student attendance patterns than institutional support.

While we have attempted to describe what is discernible from existing quantitative data bearing on the four areas of important concern to the Title III program, it has become increasingly clear to us that the most significant data either have not been collected or, if collected, have not been made available coherently. In particular, the area of the patterns of institutional development, the available data do not speak at all to the types of measures we have suggested. We believe the measures we have suggested should be pilot tested and refined for a limited number of institutions. If they prove to effectively identify the various patterns of institutional development experienced by these pilot institutions, a more substantial effort could be mounted to determine the patterns of institutional development experienced by institutions in general. Observing institutions over time and comparing those institutions which receive Title III funds with those which do not would yield some indication of the developmental impact of Title III funding. Given the decline in demand for traditional undergraduate education anticipated in the early nineteen-eighties, we think it important to begin to understand these patterns of institutional development. With such understanding, institutions could prepare themselves structurally to deal with what in all likelihood will be a declining market.

TABLE 1 MEASURES OF STRUCTURAL DEVELOPMENT IN POSTSECONDARY EDUCATION

DEVELOPMENTAL CONCEPTS	DIMENSIONS	MEASURES
1. Technological (Institutional characteristics, and viability)	a) Technological Characteristics 1) Software	- Institutional Characteristics, Capital Investment - Types of programs and services, proportion of spending on software
	2) Hardware	- Types of technologies, proportions of instruction budget spent on technological aids
	b) Program Efficiency	- Labor productivity, cost-effectiveness (efficient surface)
2. Decision Structure Development (Developmental phase of institutions based on internal history and observable characteristics)	a) Organizational Phase	- Match organizational pattern and developmental phase - Management responses to institutional crises (decision analysis)
	b) Management Efficiency	- Complexity measures, differentiation of staff, % overhead
3. Qualitative Change (Assessment of openness of the decision process and the impact of the program on students)	a) Systems Openness	- Match of organizational stage with diagnosis of organizational climate (case history) - Determination of degree of participation and decision centricity
	b) Program Impact	- Individual change, individual commitment to institution and program, comparison of student and institutional goals

Table 2

Title III
Eligibility Criteria

Percentiles for FY '74 Grantees (AIDP and BIDP)
Using Data from '74 Applications

	5%	25%	50%	75%	95%
			2–Year Public		
FTE Enrollment	395	766	1,217	2,304	4,122
Full-Time Enrollment	275	672	890	1,609	3,045
% of Faculty with Masters	40	70	79	83	91
Average Faculty Salary	7,800	8,822	10,113	11,041	14,800
% of Students from Low-Income Families[1]	14	33	47	63	86
Total E & G Expenditures	681,212	1,118,202	1,542,652	2,488,819	6,790,000
E & G Expenditures/FTE	621	1,066	1,341	1,680	2,300
Volumes in Library	10,750	20,913	27,505	34,179	47,000
			2–Year Private		
FTE Enrollment	147	205	419	592	1,204
Full-Time Enrollment	123	178	384	546	1,196
% of Faculty with Masters	60	67	74	81	86
Average Faculty Salary	6,225	7,100	7,886	8,424	9,432
% of Students from Low-Income Families[1]	17	23	38	80	94
Total E & G Expenditures	315,562	379,777	672,865	990,788	1,407,697
E & G Expenditures/FTE	555	973	1,462	2,144	4,001
Volumes in Library	5,510	18,893	21,179	29,239	40,418
			4–Year Public		
FTE Enrollment	672	1,702	2,372	3,224	5,290
% of Faculty with PhD	20	28	32	38	95
Average Salary/Professor	11,460	14,040	15,467	16,315	17,888
Average Salary/Instructor	8,000	8,696	8,905	9,485	10,840
% of Students from Low-Income Families[1]	15	42	63	79	52
Total E & G Expenditures	988,633	2,916,696	3,917,770	5,395,140	10,280,000
E & G Expenditures/FTE	1,101	1,617	1,863	2,402	3,183
Volumes in Library	45,000	75,233	95,000	120,430	242,191
			4–Year Private		
FTE Enrollment	346	532	704	1,027	1,865
% of Faculty with PhD	12	24	31	40	49
Average Salary/Professor	9,750	12,000	12,854	13,802	15,840
Average Salary/Instructor	6,883	7,650	8,330	8,871	9,470
% of Students from Low-Income Families[1]	10	24	44	77	94
Total E & G Expenditures	801,890	1,108,871	1,590,827	2,140,888	3,987,714
E & G Expenditures/FTE	1,040	1,820	2,186	2,590	3,746
Volumes in Library	27,500	48,000	57,530	69,000	96,768

[1]For purposes of this subpart a low-income family is one whose adjusted family income is less than $7,500. (20 U.S.C. 1052)

Source: Federal Register, Vol. 40, No. 107–Tuesday, June 3, 1975, p. 23859.

Total FTE Enrollment

Table 3a

Two Year

	FY70	FY71	FY72	FY73	FY74	FY75
PUBLIC						
Advanced Funded						
Mean					4,486	2,864
S.D.					1,736	1,963
N=					5	16
Basic Funded						
Mean	1,334	1,520	1,545	1,584	1,752	1,770
S.D.	1,277	1,330	1,386	1,619	2,096	2,219
N=	195	185	188	192	154	120
Not Funded						
Mean	2,285	2,249	1,886	2,163	1,858	1,070
S.D.	2,604	2,539	1,779	2,532	2,096	2,219
N=	61	91	114	77	113	120
PRIVATE						
Advanced Funded						
Mean					1,716	1,422
S.D.					2,063	1,967
N=					2	3
Basic Funded						
Mean	506	536	568	635	555	689
S.D.	538	677	791	758	738	823
N=	46	42	44	47	35	31
Not Funded						
Mean	502	473	603	344	470	445
S.D.	415	492	566	277	351	248
N=	28	283	28	15	26	29

Four Year

PUBLIC						
Advanced Funded						
Mean					2,804	3,633
S.D.					1,820	1,947
N=					5	13
Basic Funded						
Mean	2,028	2,191	2,313	2,356	2,179	2,165
S.D.	1,106	1,359	1,196	1,208	1,355	1,486
N=	75	73	66	68	67	65
Not Funded						
Mean	2,329	2,792	2,793	3,077	2,712	2,367
S.D.	1,805	2,024	2,109	2,535	2,304	1,409
N=	27	42	40	14	15	9
PRIVATE						
Advanced Funded						
Mean					1,547	1,368
S.D.					621	708
N=					12	26
Basic Funded						
Mean	920	234	939	907	778	772
S.D.	742	804	699	652	566	629
N=	153	145	141	160	158	133
Not Funded						
Mean	967	959	854	822	881	873
S.D.	991	859	545	753	793	712
N=	101	89	91	59	52	63

Percentage of Faculty with Doctorates of FTE Faculty

Table 3b

	FY70	FY71	FY72	FY73	FY74	FY75
Two Year						
PUBLIC						
Advanced Funded						
Mean					4	6
S.D.					2	4
N=					4	15
Basic Funded						
Mean	3	3	4	6	6	6
S.D.	4	4	4	10	7	8
N=	196	178	183	187	146	112
Not Funded						
Mean	4	4	5	6	7	9
S.D.	5	4	6	11	11	14
N=	61	93	115	75	101	123
PRIVATE						
Advanced Funded						
Mean					5	17
S.D.					3	19
N=					2	3
Basic Funded						
Mean	4	6	6	7	7	10
S.D.	5	6	7	11	7	8
N=	47	40	44	48	34	28
Not Funded						
Mean	7	7	6	6	8	8
S.D.	7	7	5	5	8	6
N=	27	28	28	13	24	25
Four Year						
PUBLIC						
Advanced Funded						
Mean					30	39
S.D.					4	9
N=					4	12
Basic Funded						
Mean	23	24	29	33	45	36
S.D.	11	12	10	9	87	10
N=	73	64	69	71	63	58
Not Funded						
Mean	28	31	32	33	40	42
S.D.	15	14	15	14	10	11
N=	27	40	42	14	15	9
PRIVATE						
Advanced Funded						
Mean					41	37
S.D.					10	10
N=					11	25
Basic Funded						
Mean	23	25	27	29	35	34
S.D.	10	12	12	13	60	11
N=	147	145	143	157	149	123
Not Funded						
Mean	27	26	27	24	28	28
S.D.	14	13	13	16	15	18
N=	102	90	91	55	50	56

Average Salary of Full Professors

Table 3c

Two Year

	FY70	FY71	FY72	FY73	FY74	FY75
PUBLIC						
Advanced Funded						
Mean					18,073	20,614
S.D.					0	0
N=					1	1
Basic Funded						
Mean	11,909	13,236	12,632	14,608	14,895	14,803
S.D.	1,852	2,553	3,731	3,038	3,113	4,329
N=	34	41	38	47	40	34
Not Funded						
Mean	12,279	14,950	15,615	15,433	15,904	16,423
S.D.	1,592	3,009	2,592	2,756	2,702	2,622
N=	23	38	33	25	36	42
PRIVATE						
Advanced Funded						
Mean					0	0
S.D.					0	0
N=					0	0
Basic Funded						
Mean	9,326	10,107	8,415	12,333	11,290	12,531
S.D.	2,197	1,926	4,166	2,750	2,304	2,855
N=	9	5	8	15	11	13
Not Funded						
Mean	10,018	11,707	12,485	9,717	18,736	10,891
S.D.	1,959	2,997	3,499	2,241	22,531	2,843
N=	9	14	13	9	12	10

Four Year

PUBLIC						
Advanced Funded						
Mean					16,891	17,018
S.D.					1,057	5,200
N=					5	13
Basic Funded						
Mean	12,557	14,130	14,917	15,572	16,193	16,758
S.D.	1,888	1,754	1,839	1,846	1,966	1,956
N=	65	63	65	70	64	60
Not Funded						
Mean	13,310	14,992	15,497	14,740	15,659	16,341
S.D.	1,724	2,191	3,082	1,330	1,899	1,382
N=	24	42	39	13	14	8
PRIVATE						
Advanced Funded						
Mean					16,059	15,635
S.D.					1,479	2,003
N=					11	25
Basic Funded						
Mean	10,979	12,491	12,973	13,311	13,585	13,957
S.D.	1,773	1,970	1,876	1,854	1,772	1,829
N=	146	141	129	156	150	125
Not Funded						
Mean	11,744	12,600	12,836	13,997	13,324	14,248
S.D.	2,409	2,179	2,810	2,532	2,834	2,814
N=	92	80	77	43	46	50

Average Salary of Instructors

Table 3d

Two Year

	FY70	FY71	FY72	FY73	FY74	FY75
PUBLIC						
Advanced Funded						
Mean					11,899	12,570
S.D.					1,898	2,343
N=					3	5
Basic Funded						
Mean	8,811	9,284	9,415	10,057	10,813	11,146
S.D.	1,555	1,307	1,558	1,924	1,891	1,875
N=	82	42	40	93	78	65
Not Funded						
Mean	9,427	10,123	10,181	10,801	10,913	11,359
S.D.	1,598	2,045	1,789	2,191	2,438	2,495
N=	35	41	33	49	66	77
PRIVATE						
Advanced Funded						
Mean					0	8,800
S.D.					0	0
N=					0	1
Basic Funded						
Mean	7,113	7,193	6,112	7,970	8,538	8,888
S.D.	961	873	2,829	1,098	1,211	1,550
N=	15	7	8	22	18	19
Not Funded						
Mean	6,689	7,818	8,410	7,824	8,248	8,638
S.D.	987	1,054	928	1,183	1,078	1,337
N=	14	14	13	10	16	15

Four Year

PUBLIC						
Advanced Funded						
Mean					9,755	10,290
S.D.					534	303
N=					5	12
Basic Funded						
Mean	8,047	8,666	9,013	10,439	9,652	10,148
S.D.	1,208	974	1,006	9,373	986	1,066
N=	69	62	65	70	63	58
Not Funded						
Mean	8,131	8,827	9,150	8,965	9,828	10,542
S.D.	1,960	798	1,461	729	995	1,302
N=	25	42	39	13	14	8
PRIVATE						
Advanced Funded						
Mean					9,346	9,438
S.D.					660	612
N=					11	25
Basic Funded						
Mean	7,403	7,954	8,296	8,475	8,784	9,108
S.D.	787	902	1,026	885	1,023	1,083
N=	145	140	130	153	145	119
Not Funded						
Mean	7,567	8,034	8,202	8,278	8,598	9,081
S.D.	877	1,048	1,054	1,335	1,391	1,315
N=	91	78	76	47	45	50

Percentage of Total Students with Family Income Less Than $7500 of Total Enrollment

Table 3e

Two Year

	FY70	FY71	FY72	FY73	FY74	FY75
PUBLIC						
Advanced Funded						
Mean					38	40
S.D.					20	21
N=					11	16
Basic Funded						
Mean		39	41	41	44	44
S.D.		25	22	22	25	25
N=		194	184	193	120	120
Not Funded						
Mean		28	30	36	36	36
S.D.		22	21	22	22	21
N=		100	114	79	141	136
PRIVATE						
Advanced Funded						
Mean					99	83
S.D.					0	16
N=					1	3
Basic Funded						
Mean		43	44	44	38	38
S.D.		29	25	25	24	24
N=		43	44	48	31	31
Not Funded						
Mean		46	32	40	41	39
S.D.		106	24	35	28	28
N=		28	28	15	31	29

Four Year

PUBLIC						
Advanced Funded						
Mean					52	55
S.D.					32	26
N=					5	13
Basic Funded						
Mean		45	53	53	70	48
S.D.		32	28	27	190	27
N=		74	66	71	67	65
Not Funded						
Mean		25	37	45	34	33
S.D.		22	27	27	16	20
N=		42	41	14	15	9
PRIVATE						
Advanced Funded						
Mean					47	53
S.D.					32	28
N=					12	25
Basic Funded						
Mean		37	44	38	39	36
S.D.		29	31	29	51	28
N=		149	142	160	158	133
Not Funded						
Mean		20	25	25	26	22
S.D.		20	21	22	25	21
N=		91	91	55	52	63

Total Expenditures for Education and General Purposes
(in thousands of dollars)

Table 3f

Two Year

	FY70	FY71	FY72	FY73	FY74	FY75
PUBLIC						
Advanced Funded						
Mean					7,271	4,462
S.D.					4,141	3,650
N=					5	16
Basic Funded						
Mean	860	1,656	1,903	2,189	2,305	2,570
S.D.	763	1,297	2,848	2,169	2,007	3,531
N=	203	194	186	158	154	120
Not Funded						
Mean	1,101	2,033	2,301	2,006	2,287	2,541
S.D.	1,149	2,453	2,161	1,901	2,285	2,463
N=	77	100	116	114	113	136
PRIVATE						
Advanced Funded						
Mean					3,967	3,198
S.D.					4,556	3,801
N=					2	3
Basic Funded						
Mean	279	656	769	956	764	772
S.D.	244	765	1,035	1,160	541	675
N=	47	43	44	37	35	31
Not Funded						
Mean	266	600	764	514	566	662
S.D.	221	530	623	329	340	357
N=	30	29	28	26	26	29

Four Year

PUBLIC						
Advanced Funded						
Mean					7,117	8,239
S.D.					1,119	4,123
N=					5	13
Basic Funded						
Mean	1,560	3,644	3,852	4,400	4,602	4,533
S.D.	1,039	2,348	2,161	2,795	2,977	2,787
N=	80	77	69	93	67	65
Not Funded						
Mean	1,763	4,259	4,053	3,839	4,243	4,266
S.D.	1,473	3,580	3,004	1,923	2,751	2,962
N=	30	44	42	14	15	9
PRIVATE						
Advanced Funded						
Mean					4,779	4,009
S.D.					3,162	2,584
N=					12	26
Basic Funded						
Mean	723	1,615	1,794	1,914	1,761	1,668
S.D.	557	1,181	1,199	1,443	949	904
N=	157	151	143	164	158	133
Not Funded						
Mean	874	1,748	1,402	1,582	1,842	1,945
S.D.	1,212	1,870	1,190	1,479	1,627	1,554
N=	106	94	91	58	52	63

Education and General Purposes Expenditures/FTE Student
(in thousands of dollars)

Table 3g

Two Year

	FY70	FY71	FY72	FY73	FY74	FY75
PUBLIC						
Advanced Funded						
Mean					1.6	1.6
S.D.					.5	.9
N=					5	14
Basic Funded						
Mean	.8	1.2	1.3	1.4	1.7	1.6
S.D.	.6	.4	1.2	.5	1.3	1.0
N=	195	185	183	191	153	119
Not Funded						
Mean	.7	1.2	1.3	1.5	1.4	1.4
S.D.	.3	.6	.6	.9	.8	.6
N=	59	90	113	77	153	134
PRIVATE						
Advanced Funded						
Mean					2.6	2.1
S.D.					.4	.0
N=					2	2
Basic Funded						
Mean	.6	1.4	1.5	1.6	1.9	1.5
S.D.	.3	.63	.7	.8	1.1	.8
N=	46	42	44	47	35	29
Not Funded						
Mean	.6	1.6	1.6	2.1	1.5	1.6
S.D.	.2	.9	.8	1.7	.9	.5
N=	29	29	28	15	26	29

Four Year

PUBLIC						
Advanced Funded						
Mean					2.1	2.5
S.D.					.5	1.1
N=					4	12
Basic Funded						
Mean	.8	1.7	1.7	2.0	2.1	2.1
S.D.	.3	.8	.7	.6	.8	.7
N=	74	72	66	68	63	60
Not Funded						
Mean	.9	1.6	1.6	1.5	1.7	1.8
S.D.	.4	.7	.6	.4	.4	.4
N=	27	42	40	14	15	9
PRIVATE						
Advanced Funded						
Mean					3.0	2.7
S.D.					1.0	.9
N=					12	24
Basic Funded						
Mean	.8	1.8	2.1	2.2	2.4	2.2
S.D.	.3	.6	1.4	.6	.6	.6
N=	153	145	141	160	153	126
Not Funded						
Mean	1.0	1.9	2.0	2.6	2.1	2.2
S.D.	1.0	.6	.8	4.2	.8	.9
N=	101	89	91	54	50	59

Number of Library Volumes
(in thousands of volumes)

Table 3h

Two Year

	FY70	FY71	FY72	FY73	FY74	FY75
PUBLIC						
Advanced Funded						
Mean					40	42
S.D.					11	15
N=					5	12
Basic Funded						
Mean	22	24	26	26	29	29
S.D.	10	11	13	14	19	17
N=	196	193	181	190	151	119
Not Funded						
Mean	26	27	24	26	27	31
S.D.	20	22	19	25	19	22
N=	61	98	112	76	107	127
PRIVATE						
Advanced Funded						
Mean					23	23
S.D.					0	0
N=					1	2
Basic Funded						
Mean	20	22	23	22	24	24
S.D.	7	9	9	9	11	12
N=	47	42	43	45	34	28
Not Funded						
Mean	21	22	23	19	19	24
S.D.	13	10	9	8	6	10
N=	28	28	43	15	24	27

Four Year

PUBLIC						
Advanced Funded						
Mean					170	179
S.D.					68	92
N=					5	11
Basic Funded						
Mean	78	87	99	103	111	113
S.D.	50	57	57	57	59	54
N=	76	76	65	70	61	59
Not Funded						
Mean	88	96	109	118	126	128
S.D.	64	69	92	68	65	53
N=	27	42	40	14	15	9
PRIVATE						
Advanced Funded						
Mean					154	124
S.D.					107	94
N=					12	25
Basic Funded						
Mean	56	62	66	70	65	66
S.D.	32	37	41	44	29	22
N=	151	148	139	161	154	126
Not Funded						
Mean	69	63	65	60	71	75
S.D.	68	37	42	49	59	59
N=	102	91	87	59	50	57

Table 4

Correlation Matrix

Title III Award with Income Sources

PUBLIC INSTITUTIONS

	Comprehensive Colleges and Universities (Carnegie Codes: 21 & 22)			Two Year Colleges (Carnegie Code: 41)		
	1972	1973	1974	1972	1973	1974
Income: E & GP	.41811	.64011	.57975	.16536	.05740	.17338
Income: Federal – T3	.36370	.44340	.45531	.13092	.03432	.16905
Income: State Government	.38378	.50625	.45941	.02860	-.02006	.10808
Income: Local Government	*	*	*	.29222	.15682	.21631
Income: Student Aid	.45668	.46392	.40155	.29688	.04596	.37945
Income: Endowment	*	-.48078	-.49072	*	*	*
Direct Corporate Support	*	.45819	.36303	*	-.19794	*
Alumni Support	*	.40243	.42470	*	-.25445	*
Foundation Support	*	.28891	.28461	*	.34152	*
NonAlumni Support	*	-.01416	.16469	*	-.02414	*

PRIVATE INSTITUTIONS

	Liberal Arts Colleges II (Carnegie Code: 32)			Two Year Colleges (Carnegie Code: 41)		
	1972	1973	1974	1972	1973	1974
Income: E & GP	.48185	.48488	.52676	.01223	.18798	.31693
Income: Federal – T3	.11827	.02018	.30469	-.02000	-.02552	.31158
Income: State Government	*	.40508	.56883	*	*	*
Income: Local Government	*	*	*	*	*	*
Income: Student Aid	.55049	.55439	.58232	.31833	.17238	.31412
Income: Endowment	.13381	.05697	.06129	.46860	-.00039	-.14819
Direct Corporate Support	.33291	.19100	.28051	*	.54543	*
Alumni Support	-.21480	-.19556	-.29588	*	-.23687	*
Foundation Support	.26803	.25797	.46030	*	.43608	*
NonAlumni Support	.10713	.53563	.33419	*	.40608	*

* Number of available cases for this variable less than 15.

Table 5 Student-Faculty Ratios for Private Highly Selective Liberal Arts Colleges

		Total Enrollment/Faculty
Average		13.8
Frontier:	typical institution	18.7
	high level of research	17.5
	large number of fields	16.5

Table 6 Cost-Per-Student Ratios for Private Highly Selective Liberal Arts Colleges

		Cost/Total Enrollment
Average		$1,371
Frontier:	typical institution	768
	low level of part-time undergraduates	796
	high level of part-time undergraduates	719
	small institution	780

Table 7 Student-Faculty Ratios for Public Comprehensive Colleges and Universities

		Total Enrollment/Faculty
Average		23.5
Frontier:	typical institution	32.1
	no teaching assistants	29.8
	large number of fields	31.6
	low level of part-time undergraduates	29.2
	high level of part-time undergraduates	33.6

Table 8 Cost-Per-Student Ratios for Public Comprehensive Colleges and Universities

		Cost/Total Enrollment
Average		$863
Frontier:	typical institution	514
	high level of graduate students	525
	no research	499
	high level of research	533
	small institution	515

Source: Carlson (1975) p. 50

NOTES

1. Appendix A provides a detailed review of the legislative history of Title III of the Higher Education Act of 1965, as amended.
2. These theories are described in much greater detail in Appendix B.
3. Sunrise Semester, the University of Mid-America and the British Open University are examples of media-based institutions.
4. David Riesman is credited with developing the concept of the "academic procession" (Riesman, 1956).
5. The recently published General Accounting Office (U.S. Comptroller General, 1975) report on Title III uses discriminant analyses to identify factors which "explain" Title III staff decisions whether to fund and how much to fund an applicant institution.
6. Here we are referring to "resource use efficiency" or "production efficiency" or "technical efficiency". See Wallhaus (1975).
7. A full discussion of the history and technical approaches of these various forms of analysis is given in Appendix D.
8. Appendix E provides the technical description of our statistical estimation of these effects.
9. The variability in resource use of private highly selective liberal arts colleges given in Tables 5 and 6 support this observation.
10. There is no implication that all efficient institutions are homogeneous in any respect. While these institutions have only recently been identified, they have not been studies to any degree to determine their actual characters.

References

Detailed bibliographies on the topics covered in this report are included in the Appendices. The following references were specifically referred to in this report.

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